

## Distribution of Grain Size of Sediment at Gapang Beach, Sabang City, Province of Aceh

Khairunnisa, Ririn Indriani, Januar Nanda, Andria Mauliza, Viqqi Kurnianda

Department of Marine Science, Faculty of Marine Science and Fisheries, Syiah Kuala University, Banda Aceh 23111, INDONESIA  
[60khairunnisa@gmail.com](mailto:60khairunnisa@gmail.com), [indrianiririn852@gmail.com](mailto:indrianiririn852@gmail.com), [nandabako88@gmail.com](mailto:nandabako88@gmail.com), [andriamauliza54@gmail.com](mailto:andriamauliza54@gmail.com), [viqqikurnianda@yahoo.co.id](mailto:viqqikurnianda@yahoo.co.id)

### ABSTRACT:

Research of the characteristics of sediment grain size at Gapang beach, Sabang, Province of Aceh in March 2017 has been done. This study aims to determine the size of grains of sediment in the coast of Gapang, Sabang, Aceh Province. The 4 location of the sampling determined with coring method and granulometry analysis using multilevel sifter method. The results showed that the grain size of sediment at Station 1 was dominated by gravel with an average weight percentage of 35.5%, at Station 2 and 3 dominated by gravel with an average percentage weight rating of 41.56% and 45.39% and at Station 4 is dominated by gravel with an average percentage weight of 46.88%. Based on the value of grain size of sediment indicates that the coast of gapang sea has the potential to experience sediment deposition.

**Key words:** Sediment; coring; multilevel sifter

### INTRODUCTION

Gapang Beach is one of the beaches located in the city of Sabang, Aceh province that has a natural wealth under the sea, making the attraction for tourists to do underwater tourism in these waters. Sedimentation process can occur anytime that can affect the coastal ecosystem Gapang, especially coral reefs. Sedimentation is a form of threat both directly and indirectly that can lead to degradation of coral reefs [1,2]. Until now, research on the distribution of sediments in the coastal area of Gapang is still very limited.

Information on the size of the grains of sediment is very important, because it can directly affect the turbidity of water. In areas with fine sediment grains are highly susceptible to increased turbidity that directly or indirectly affects the presence of coral reefs and biota contained within the ecosystem [3,4].

### METHODOLOGY

#### 1. Location

Sediment samples were collected at Gapang beach, Sabang, Province of Aceh on March 2017 which is divided into 4 points stations with distance between stations are 50 meters "Fig.1".

#### 2. Analysis of classification of grain size of sediment

Sediment sampling was performed by coring method using PVC paralon with 3.5 inch diameter

with sample layer thickness is 20 cm based on American Society for Testing and Materials standard D4823-95 [5]. The sediment samples were weighed and analyzed using a wet screen method on a 2-mm, 1 mm, 0.5 mm, 0.25 mm, 0.125 mm, 0.063 mm, 0.038 mm and a shelter accommodated in a container [6]. After sieving, the sediment samples left on each filter [7,8,9]. Calculation of the percentage weight of the sedimentary fraction is calculated using the equation :

$$\% \text{ Weight} = \frac{\text{Weight of } i - \text{fraction}}{\text{Total weight of sample}} \times 100\% \quad (1)$$

### Result

The result of sediment analysis at Gapang seaside, Sabang shows three major fractions of sediment, which is gravel, sand and mud which have percentage weight of different sedimentary fractions at each station "Table.1".

The results show that the sediment at Station 1 was dominated by 35.5% gravel followed by medium sand 27.78%, at Station 2 dominated gravel 41.56% followed by very fine sand 25.99%. At Station 3 is dominated by 45.39% gravel followed by very crude sand 23.22% and at Station 4 is dominated gravel 46.88% followed by very fine sand 24.38%. In general, the sediment characteristics on the coast of Gapang, Sabang shows the dominance of sediments of high gravel type.

## Discussion

Field observations show that there are the number of coral reef points, where the conditions are indicated to allow the coarse grain process to enter the stations. Based on these data, the characteristics of sediments on the coast of Gapang, Sabang is dominated by sediments of high gravel type.

Based on data of the weight percentage of grain size obtained shows that sediment is dominated by gravel type found on Gapang beach, Sabang. This is

due to the condition of the aquatic environment that has a strong current. Waters with strong currents will precipitate large particles, otherwise waters with weak currents will precipitate fine mud particles [10,11,12].

The distribution pattern of unequal sediment size fractions can be used as an indicator of sediment flow behavior deposited by the transport agent. Waters with strong currents will find coarse grains and waters with weak currents will precipitate more fine grain [13,14,15].

Figure 1. Map of Gapang beach, Sabang



Table 1. percentage weight of sedimentary fractions

| Sediment Type   | Average Value (%) |            |             |            |
|-----------------|-------------------|------------|-------------|------------|
|                 | Station I         | Station II | Station III | Station IV |
| Gravel          | 35.5              | 41.56      | 45.39       | 46.88      |
| Very rough sand | 18.77             | 8.96       | 23.22       | 7.27       |
| Rough sand      | 8.87              | 7.73       | 20.72       | 7.62       |
| Medium Sand     | 27.78             | 9.62       | 5.68        | 13.83      |
| Fine Sand       | 0.39              | 6.11       | 0           | 0          |
| Very Fine Sand  | 8.67              | 25.99      | 4.97        | 24.38      |
| Mud             | 0                 | 0.001      | 0           | 0          |

## CONCLUSION

The results showed that the sediment at Station 1 was dominated by 35.5% gravel followed by medium sand 27.78%, on Station 2 dominated gravel 41.56% followed by very fine sand 25.99%. At Station 3 is dominated by 45.39% gravel followed by very crude sand 23.22% and on Station 4 is dominated gravel 46.88% followed by very fine sand 24.38%. This indicates that the Gapang sea coast deposits large particles to the beach. Physical - chemical parameters analysis is needed to determine the condition of the coral reef ecosystem so that it can relate the distribution of grain size of sediment to the biota life considering the waters of Gapang is a dive center for local and foreign tourists

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